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10 CFR 50.73

November 19, 2010
BW100125

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

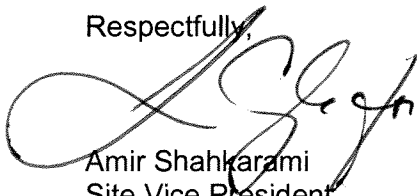
Braidwood Station, Unit 1
Facility Operating License No. NPF-72
NRC Docket No. STN 50-456

Subject: Licensee Event Report 2010-004-00 – Unit 1 Reactor Trip Due to Performance of a Channel Calibration With a Coincident Bistable in a Half-Trip Condition

The enclosed Licensee Event Report (LER) is being submitted in accordance with 10 CFR 50.73, "Licensee event report system," paragraph (a)(2)(iv)(A), as an event that resulted in a valid actuation of the reactor protection system and auxiliary feedwater system. On September 20, 2010, during performance of a channel calibration of a steam generator water level channel, Braidwood Station Unit 1 received an actuation of the reactor protection system (reactor trip) and the auxiliary feedwater system. A universal logic card failure resulted in one input being in the tripped state, creating an unknown half trip condition. During performance of the channel calibration when the coincident loop bistable was tripped, the 2-of-4 logic was met which caused an immediate turbine trip and subsequent reactor trip. 10 CFR 50.73(a) requires an LER to be submitted within 60 days following discovery of the event. Therefore, this report is being submitted by November 19, 2010.

There are no regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact Mr. Ronald Gaston, Regulatory Assurance Manager, at (815) 417-2800.

Respectfully,



Amir Shahkarami
Site Vice President
Braidwood Station

Enclosure: LER 2010-004-00

cc: NRR Project Manager – Braidwood Station
Illinois Emergency Management Agency – Division of Nuclear Safety
US NRC Regional Administrator, Region III
US NRC Senior Resident Inspector (Braidwood Station)

NRC FORM 366 (10-2010)				U.S. NUCLEAR REGULATORY COMMISSION APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013											
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)								Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.							
1. FACILITY NAME Braidwood Station, Unit 1						2. DOCKET NUMBER 05000456		3. PAGE 1 of 3							
4. TITLE Reactor Trip Due to Performance of a Channel Calibration With a Coincident Bistable in a Half-Trip Condition															
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED						
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER					
09	20	2010	2010	- 004	- 00	11	19	2010	N/A	N/A					
9. OPERATING MODE <div style="text-align: center; font-size: 2em;">1</div>			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: <i>(Check all that apply)</i>												
10. POWER LEVEL <div style="text-align: center; font-size: 1.5em;">100</div>			<div style="display: flex; flex-wrap: wrap;"> <div style="width: 20%;"><input type="checkbox"/> 20.2201(b)</div> <div style="width: 20%;"><input type="checkbox"/> 20.2203(a)(3)(i)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(i)(C)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(vii)</div> <div style="width: 20%;"><input type="checkbox"/> 20.2201(d)</div> <div style="width: 20%;"><input type="checkbox"/> 20.2203(a)(3)(ii)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(ii)(A)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(viii)(A)</div> <div style="width: 20%;"><input type="checkbox"/> 20.2203(a)(1)</div> <div style="width: 20%;"><input type="checkbox"/> 20.2203(a)(4)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(ii)(B)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(viii)(B)</div> <div style="width: 20%;"><input type="checkbox"/> 20.2203(a)(2)(i)</div> <div style="width: 20%;"><input type="checkbox"/> 50.36(c)(1)(i)(A)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(iii)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(ix)(A)</div> <div style="width: 20%;"><input type="checkbox"/> 20.2203(a)(2)(ii)</div> <div style="width: 20%;"><input type="checkbox"/> 50.36(c)(1)(ii)(A)</div> <div style="width: 20%;"><input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(x)</div> <div style="width: 20%;"><input type="checkbox"/> 20.2203(a)(2)(iii)</div> <div style="width: 20%;"><input type="checkbox"/> 50.36(c)(2)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(v)(A)</div> <div style="width: 20%;"><input type="checkbox"/> 73.71(a)(4)</div> <div style="width: 20%;"><input type="checkbox"/> 20.2203(a)(2)(iv)</div> <div style="width: 20%;"><input type="checkbox"/> 50.46(a)(3)(ii)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(v)(B)</div> <div style="width: 20%;"><input type="checkbox"/> 73.71(a)(5)</div> <div style="width: 20%;"><input type="checkbox"/> 20.2203(a)(2)(v)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(i)(A)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(v)(C)</div> <div style="width: 20%;"><input type="checkbox"/> OTHER</div> <div style="width: 20%;"><input type="checkbox"/> 20.2203(a)(2)(vi)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(i)(B)</div> <div style="width: 20%;"><input type="checkbox"/> 50.73(a)(2)(v)(D)</div> </div>												
			Specify in Abstract below or in NRC Form 366A												
12. LICENSEE CONTACT FOR THIS LER															
FACILITY NAME Ronald Gaston, Regulatory Assurance Manager								TELEPHONE NUMBER <i>(Include Area Code)</i> (815) 417-2800							
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT															
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX						
E	JG	ECBD	W120	Y	N/A	N/A	N/A	N/A	N/A						
14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES <i>(If yes, complete 15. EXPECTED SUBMISSION DATE)</i> <input checked="" type="checkbox"/> NO					15. EXPECTED SUBMISSION DATE										
					MONTH DAY YEAR N/A N/A N/A										
ABSTRACT <i>(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)</i>															
<p>On September 20, 2010, Maintenance initiated performance of a Technical Specification surveillance calibration of a steam generator water level channel. At 1704, when a bistable for the channel under test was placed in the tripped condition per the surveillance, an automatic turbine trip was received. The turbine trip was immediately followed by an automatic reactor trip due to the turbine trip while the reactor was greater than 30% power. Following the reactor trip, the auxiliary feedwater pumps auto started on low-2 steam generator water levels.</p> <p>Investigation determined that a universal logic card in the solid state protection system failure resulted in one input being in the tripped state, creating an unknown half trip condition. During performance of the channel calibration when the coincident loop bistable was tripped, the 2-of-4 logic was met which caused an immediate turbine trip. The direct cause for this event was failure of the universal logic card. The root cause evaluation has not been completed.</p> <p>The corrective actions to prevent recurrence include implementing first time preventative maintenance replacements of the SSPS universal logic cards for Unit 1 (completed) and Unit 2 (scheduled).</p> <p>There were no actual safety consequences impacting plant or public safety as a result of the event. This event is being reported pursuant to 10 CFR 50.73(a)(2)(iv)(A) due to actuation of the reactor protection system (reactor trip) and the auxiliary feedwater system.</p>															

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Braidwood Station, Unit 1	05000456	YEAR	SEQUENTIAL NUMBER	REV NO.	2 OF 3
		2010	- 004	- 00	

NARRATIVE

A. Plant Operating Conditions Before The Event:

Event Date: September 20, 2010

Event Time: 1704 CDT

Unit: 1

MODE: 1

Reactor Power: 100 percent

Unit 1 Reactor Coolant System [AB]:

Normal operating temperature and pressure

B. Description of Event:

No Unit 1 structures, systems, or components were inoperable at the start of this event that contributed to the event.

On September 20, 2010, Maintenance initiated performance of a Technical Specification (TS) surveillance calibration of channel 538 of the 1C steam generator (SG) [SJ] water level. This surveillance requires that the channel under test be placed in the tripped condition. In support of this surveillance, Operations entered TS 3.3.1 "Reactor Trip System (RTS) Instrumentation," Conditions A and E and TS 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," Conditions A and D, for one channel being inoperable.

- At 1704, Maintenance placed a bi-stable for channel 538 into trip. At that time, an automatic turbine trip was received. The turbine trip was immediately followed by an automatic reactor trip due to the turbine trip while the reactor was greater than 30% power. Following the reactor trip, the auxiliary feedwater (AF) [BA] pumps auto-started on low-2 steam generator water levels.

Operator response to the trip was proper and safety systems and controls performed as expected with the exception of the B Train feedwater isolation was not able to be reset following the reactor trip.

This event is reportable under 10 CFR 50.73(a)(2)(iv)(A), any event or condition that resulted in manual or automatic actuation of any of the systems listed in 10 CFR 50.73(a)(2)(iv)(B) including any event or condition that results in actuation of the reactor protection system (RPS) when the reactor is critical, and actuation of the PWR auxiliary feedwater system.

C. Cause of Event

The direct cause for this event was failure of the universal logic card. The root cause evaluation has not been completed.

The SSPS is designed to protect the reactor via reactor trip and/or safety system actuations in the event that a specified number of protection channels are in their tripped state. This is implemented using integrated circuit gates on universal logic cards to create coincidences (1-of-4, 2-of-4, 2-of-3, etc.) When a logic coincidence is satisfied, the card's output transitions to a trip state which either feeds into another universal logic card, a safeguards driver card, or the undervoltage driver card. Each safeguards driver card energizes the appropriate slave relays to actuate safeguards equipment based on the protection parameter that has been exceeded. When the undervoltage driver card sees a trip input, 48VDC is removed from the reactor trip breaker undervoltage coil causing the breaker to open.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
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NARRATIVE

The evaluation of this event determined that Braidwood Unit 1 tripped due to a failed universal logic card in Train B SSPS. Troubleshooting revealed that universal logic card A409 had a failure that resulted in one input being in the tripped state, creating an unknown half trip condition. During performance of an 18-month calibration for channel 538 of 1C SG level, and when the coincident loop bistable was tripped, the 2-of-4 logic was met which caused an immediate turbine trip. Additionally, this failure prevented the B Train feedwater isolation from being able to be reset.

A failure analysis was performed on card A409. The analysis identified that the output of A409 failed low due to silver migration across an input zener diode. The failed diode was manufactured in 1971 and functioned normally since Unit 1 start-up.

D. Safety Consequences:

There were no safety consequences impacting plant or public safety as a result of this event

The reactor trip system responded automatically due to the trip signal received. There was no loss of any function that would have prevented fulfillment of actions necessary to 1) Shutdown the reactor and maintain it in a safe shutdown condition, 2) Remove residual heat, 3) Control the release of radioactive material, or 4) Mitigate the consequences of an accident.

This event did not result in a safety system functional failure.

E. Corrective Actions:

The corrective actions to prevent recurrence include implementing first time preventative maintenance replacements of the SSPS universal logic cards for Unit 1 (completed) and Unit 2 (scheduled).

A supplement to the LER will be submitted pursuant to the guidance of NUREG 1022 when the root cause evaluation is complete.

F. Previous Occurrences:

There have been no previous, similar events identified at the Braidwood Station.

G. Component Failure Data:

Manufacturer
Westinghouse

Nomenclature
Universal Logic Card

Model
N/A

Mfg. Part Number
6056D20